

## REMARKS

Claims 1-18 are now pending in the application. Claim 18 has been amended to recite that the biaxially stretched container has a natural stretch ratio (NSR) of less than or equal to 9.6. This amendment is similar to the subject matter of dependent Claim 8 and independent Claim 17 relating to the NSR of the polyester resin employed in a parison or a container. No new matter has been added. Support for this amendment can be found throughout the specification and claims as originally filed and at page 6, lines 8-22; page 12, lines 1-3, by way of non-limiting example. The Examiner is respectfully requested to enter these amendments and to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

### **REJECTIONS UNDER 35 U.S.C. § 103**

Claims 1-3, 5, 7-8, 10, 12-13 and 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fagerburg et al. (U.S. Pat. No. 4,499,252) (hereafter "*Fagerburg*") in view of Banach et al. (U.S. Pat. No. 5,902,873) (hereafter "*Banach*") and optionally Shelby et al. (U.S. Pub. No. 2002/0166833) (hereafter "*Shelby*") and Sprayberry et al. (WO 98/48994) (hereafter "*Sprayberry*"). This rejection is respectfully traversed.

Claims 4 and 15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over *Fagerburg* in view of *Banach*, *Shelby*, and *Sprayberry*, and further in view of Abe et al. (Japanese Pat. No. 03146710) (hereafter "*Abe*"). This rejection is respectfully traversed.

Claim 6 stands rejected under 35 U.S.C. 103(a) as being unpatentable over *Fagerburg* in view of *Banach, Shelby, and Sprayberry*, and further in view of Amano et al. (U.S. Pat. No. 6,096,683) (hereafter "*Amano*"). This rejection is respectfully traversed.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fagerburg* in view of *Banach, Shelby, and Sprayberry*, and further in view of Schmidt et al. (U.S. Pub. No. 2002/0177686) (hereafter "*Schmidt*"). This rejection is respectfully traversed.

Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fagerburg* in view of *Banach, Shelby, and Sprayberry*, and further in view of Po' et al. (U.S. Pat. No. 5,252,282) (hereafter "*Po*"). This rejection is respectfully traversed.

Claim 10 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fagerburg* in view of *Banach, Shelby, and Sprayberry*, and further in view of PET Packaging Technology (hereafter "*PPT*"). This rejection is respectfully traversed.

Claims 11 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fagerburg* in view of *Banach, Shelby, and Sprayberry*, and further in view of Feddersen et al. (U.S. Pat. No. 5,047,271) (hereafter "*Feddersen*"). This rejection is respectfully traversed.

Claims 13 and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fagerburg* in view of *Banach, Shelby, and Sprayberry*, and further in view of the *PPT* reference. This rejection is respectfully traversed. This rejection is respectfully traversed.

Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fagerburg* in view of *Banach*, the *PPT* reference, and *Fagerburg*. This rejection is respectfully traversed.

Independent Claim 18 has been amended to recite that the polyester resin forming the biaxially stretched container has a natural stretch ratio (NSR) of less than or equal to 9.6. Applicants respectfully submit that the claimed invention, reciting a parison or container formed from a polyester resin having a natural stretch ratio (NSR) of less than 10 (as recited in Claims 1-7 and 9-16) or less than or equal to 9.6 (as recited in Claims 8 and 17-18) with the recited components is non-obvious and patentable over the cited art.

Applicants respectfully disagree that the art of record inherently describes a resin having an NSR in the range claimed. Final Office Action at p. 4. The Examiner's consideration of the claimed invention in view of comparative test data contained in Applicants' specification is respectfully requested. See for example, the BPAI non-precedential decision in *Ex Parte Ramsden*, Appeal No. 2009-002984 (BPAI, Dec. 30, 2009), reversing the rejection for obviousness and instructing that an examiner must consider evidence of non-obviousness contained in an applicant's specification. The comparative data in Applicants' specification demonstrates that increasing  $\text{Na}_2\text{HPO}_4$  (disodium monophosphate) unexpectedly provides desirably low natural stretch ratios (NSR) of less than 10 and in certain aspects, an NSR of less than or equal to 9.6. The scope and content of the cited art neither fairly teaches nor predicts such a result.

The primary reference, *Fagerburg*, describes a PET polymer including a di-functional sulfomonomer modifier. Col. 2, line 51 to col. 3, line 4. Secondary reference

*Banach* is cited by the Office for describing a phosphate forming compound ( $\text{Na}_2\text{HPO}_4$ ) added to a PET polymerization process. *Banach* sets forth an exemplary list of phosphate forming compounds as follows:

Non-limiting, specific examples include sodium dihydrogen phosphate, trisodium phosphate, disodium hydrogen phosphate, disodium hydrogen phosphite, and sodium dihydrogen phosphite. The alkali metal hypophosphite can be a hypophosphite salt containing any number of alkali metal groups. The alkali metal polyphosphate can be a polyphosphate salt containing one, two, three, four or five alkali metal groups. Moreover, other alkali metals (e.g., potassium or lithium) could be used in place of sodium for many of these compounds. In some preferred embodiments, sodium dihydrogen phosphate is the preferred phosphate-forming compound.

Col. 4, lines 32-43; col. 4, lines 25-30.

The Office Action proposes combining a modified resin material like that in primary reference *Fagerburg* with the phosphate forming compounds of secondary reference *Banach*, and alleges that the NSR would be inherent in such a polyester resin composition.<sup>1</sup> However, comparative test results for polyester resins in Applicants' Table 1 demonstrate that the proposed combination of the cited art will not inherently produce the claimed polyester resins having NSR of below 10. The Examiner's attention is directed to the comparative data provided in Applicants' specification at Table 1, which sets forth three compositions similar to those in the art of record (a simplified version of Table 1 is shown for demonstration purposes).

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<sup>1</sup> While not necessarily germane to the issues discussed here, the calculations provided in the Office Action of mass concentration of  $\text{Na}_2\text{HPO}_4$  in *Banach* are inaccurate, because they fail to account for the molecular weight of hafnium-based catalyst component, which is hafnium tetrakis (acetylacetonate) (not merely acetylacetone) at col. 3, lines 56-57, which has a molecular weight of approximately 574.5 g/mol.

|  | Comp. Ex. 1         | Ex. 2       | Ex. 3               |
|--|---------------------|-------------|---------------------|
| Sodium dimethyl-5-sulfonatoisophthalate (5-SIM) modifier |                     |             | X<br>(40 mg)        |
| NaH <sub>2</sub> PO <sub>4</sub>                         | 14 mg<br>(~4.3 ppm) | X<br>216 mg | 14 mg<br>(~4.3 ppm) |
| Na <sub>2</sub> HPO <sub>4</sub>                         | X<br>196 mg         | 0 mg        | X<br>196 mg         |
| Natural Stretch Ratio (NSR)                              | 10.9                | 11.9        | 11.6                |

Comp. Ex. 1 is a PET polymer lacking any sodium dimethyl-5-sulfonatoisophthalate (5-SIM) modifier (described in JP 59-093723), but including 196 mg of Na<sub>2</sub>HPO<sub>4</sub> (and 14 mg of NaH<sub>2</sub>PO<sub>4</sub>). Such a PET resin having a phosphate compound is generally representative of the resin of *Banach*. The Office Action cites *Banach* for suggesting adding phosphate compounds to PET resins at overlapping concentrations with those claimed. *Banach* describes adding a total amount of 25 to 500 ppm of a catalyst component relative to carboxylic acid or corresponding ester or ester-forming derivative used. Col. 6, lines 23-27. The catalyst may optionally contain a phosphate forming compound at 10 to 85% of the total catalyst composition, in other words, the phosphate compound may be present at 2.5 to 425 ppm based on the acid, ester, or ester-forming derivative of the PET resin. Col. 4, lines 48-52 and col. 6, lines 23-27. The amount of phosphate-forming compounds in Table 1 overlap with the ranges set forth in *Banach*, yet contrary to the assertion by the Office, these comparative compositions do not achieve the claimed NSR of less than 10.

For example, in Comp. Ex. 1 of Table 1, the sum of polyester carboxylic acid precursors is 2,000 g (DMT at 2,000 g + 5-SIM at 0 g). For the "phosphate-forming compounds," there are 196 mg of Na<sub>2</sub>HPO<sub>4</sub> and 14 mg of NaH<sub>2</sub>PO<sub>4</sub>. Thus, 196 mg Na<sub>2</sub>HPO<sub>4</sub> per 2 kg of resin ester/acid precursor components totals 98 mg/kg and 14 mg

$\text{Na}_2\text{HPO}_4$  per 2 kg of resin ester/acid precursor components is 7 mg/kg to amount to a total phosphate forming compound of 105 mg/kg or ppm. These concentrations in Comp. Ex. 1 fall within the specified ranges of *Banach's* phosphate forming compound.

For comparison, Ex. 2 is the same composition as Comp. Ex. 1, except  $\text{Na}_2\text{HPO}_4$  is replaced by  $\text{NaH}_2\text{PO}_4$ , again representative of the resin and amount of phosphate-forming compound of the *Banach* reference. The sum of polyester acid precursors in Ex. 2 of Table 1 is 2,000 g (DMT at 2,000 g + 5-SIM at 0 g). Thus, 216 mg  $\text{NaH}_2\text{PO}_4$  per 2 kg of resin ester/acid precursor components totals 108 mg/kg. Again, the amount of phosphate forming compound ( $\text{NaH}_2\text{PO}_4$ ) falls within the specified ranges in *Banach*.

Finally, Ex. 3 in Table 1 has the same PET polymer of Comp. Ex. 1, however further includes a 5-SIM modifier, with  $\text{Na}_2\text{HPO}_4$  present at 196 mg and  $\text{NaH}_2\text{PO}_4$  at 14 mg, similar to that of Comp. Ex. 1. Thus, Ex. 3 represents a combination of a modified PET resin similar to that in *Fagerburg* (having a 5-SIM monomer) with the phosphate forming compound of *Banach* with  $\text{Na}_2\text{HPO}_4$  and restricted  $\text{NaH}_2\text{PO}_4$  (in other words, a resin according to the Office's proposed modification of *Fagerburg* by the teachings of *Banach*). The sum of polyester acid precursors in Ex. 3 of Table 1 is 2,040 g (DMT at 2,000 g + 5-SIM at 40 g). Thus, 196 mg  $\text{Na}_2\text{HPO}_4$  per 2.04 kg of resin ester/acid precursor components totals 96.1 mg/kg and 14 mg  $\text{NaH}_2\text{PO}_4$  is 6.7 mg/kg to total 102.8 mg/kg or ppm of phosphate forming compounds. Again, the amount of phosphate forming compounds ( $\text{Na}_2\text{HPO}_4$  and  $\text{NaH}_2\text{PO}_4$ ) falls within the ranges specified by *Banach*.

Thus, the amount of phosphate-forming compounds provided in Table 1 generally corresponds to the amounts that would be selected by one of skill in the art

based on *Banach*'s discussion of selection of the phosphate-forming compound relative to the acid or ester component of the resin. Yet, as can be seen and further as noted on page 22, lines 9-17 of Applicants' specification, none of the examples in Table 1 is capable of achieving a satisfactory NSR of below 10. Therefore, an NSR of less than 10 is not inherent in either *Fagerburg* or *Banach*; nor can it be the expected outcome of modifying *Fagerburg* with *Banach*.

Neglecting the lack of guidance in the cited references to select  $\text{Na}_2\text{HPO}_4$  while excluding  $\text{NaH}_2\text{PO}_4$  with the particular claimed resin materials, even in a circumstance where  $\text{Na}_2\text{HPO}_4$  is selected, it does not necessarily result in the claimed NSR. The supposition that the claimed NSR ranges are inherent in the prior art is unsupported and indeed contradicted by comparative tests from Applicants' specification.

Furthermore, nothing in the cited art describes or otherwise suggests the predictability of modifying the amount of  $\text{Na}_2\text{HPO}_4$  and  $\text{NaH}_2\text{PO}_4$  stabilizers to achieve an NSR of less than 10. *Banach* describes a wide array of different phosphate compounds (including polyphosphates), without providing any guidance to select certain compounds at specified concentrations, while avoiding others. Nothing in *Banach* describes or suggests to a person of ordinary skill in the art that  $\text{Na}_2\text{HPO}_4$  should be selected for the claimed resin system having an intrinsic viscosity of 0.6 to 1.0, while excluding/minimizing  $\text{NaH}_2\text{PO}_4$  to below 9 ppm, so that a natural stretch ratio of the material can be beneficially reduced. Instead, *Banach* specifies that  $\text{NaH}_2\text{PO}_4$  is the preferred phosphate-forming compound to be included in its catalyst system, thus teaching away by leading one of skill in the art on a divergent path from the claimed invention, which requires minimizing  $\text{NaH}_2\text{PO}_4$ . *Banach* only pertains to predicting a

rate of reaction, there can be no expectation of achieving any other particular property or result. As noted above in regard to the data in Table 1, even inclusion of  $\text{Na}_2\text{HPO}_4$  (as a reactivity enhancer at concentrations of *Banach's* catalyst system) in a sulfo-monomer modified PET resin is insufficient to achieve an NSR of less than 10 (as in Claim 1) or further less than 9.6 (as in Claims 8 and 17-18). It was a surprising and unexpected benefit of the claimed invention, to achieve the claimed NSR ranges where  $\text{Na}_2\text{HPO}_4$  is selected as a stabilizer at a concentration of phosphor in an amount of 10 to 200 ppm based on the polyester resin weight, while  $\text{NaH}_2\text{PO}_4$  is excluded or maintained at a *de minimus* level of less than 9 ppm.

Neither the *Shelby* nor *Sprayberry* references account for these deficiencies in *Fagerburg* and *Banach*. Nothing in *Shelby* or *Sprayberry* provides a person of skill in the ordinary art with any apparent reason to arrive at the claimed invention. For example, while *Shelby* discusses a planar stretch ratio for the container of about 9 for a 2-liter bottle, a planar stretch ratio is distinct from a natural stretch ratio where the onset of strain hardening occurs. See e.g., Applicants' specification at p. 2, lines 10-27, p. 11, line 27 to p. 12, line 3, p. 29, lines 20-25. *Sprayberry* provides polyesters having superior stretching characteristics by having higher natural stretch ratios for highly stretched (mechanically oriented) PET bottles. *Sprayberry* specifies that such polyesters have natural stretch ratios (NSR) of greater than 13 and preferably about 14 and about 15.5. P. 2, lines 13-16; p. 7, lines 5-12. *Sprayberry* leads a person of ordinary skill in a divergent direction, because Applicants sought and claim, parisons or containers containing a polyester resin having an NSR of less than 10. While the NSR of *Sprayberry's* inventive polyester resins are designed to be within 10% of the planar



stretch ratio in the range of 13 and 15.5, *Sprayberry* does not teach, suggest, or predict in any way that all polyester resins would have low NSRs that potentially match low stretch ratios below the specified ranges. Further, nothing in *Sprayberry* or *Shelby* provides any suggestion that modifying  $\text{Na}_2\text{HPO}_4$  and  $\text{NaH}_2\text{PO}_4$  concentrations impacts NSR in any way.

*Abe*, *Amano*, *Schmidt*, *Po*, the *PPT* reference, and *Feddersen*, whether considered independently or as combined, fail to account for the deficiencies of *Fagerburg*, *Banach*, *Shelby*, and *Sprayberry*. None of these references describe or suggest forming containers or parisons of polyester resin systems like those claimed, which include a modifier and  $\text{Na}_2\text{HPO}_4$ , which is further free of  $\text{NaH}_2\text{PO}_4$  or has less than about 9 ppm  $\text{NaH}_2\text{PO}_4$ , and capable of being formed to have a natural stretch ratio of less than 10. None of the *Po*, *PPT*, or *Feddersen* references pertain to adjusting stabilizers in modified polyester resin systems to arrive at the claimed levels for achieving the desired NSR and intrinsic viscosity, while limiting diethylene glycol content.

For these additional reasons, Claim 6 is patentable over the cited art. *Amano* is cited for providing disodium phosphate dodecahydrate at col. 8, line 7; however, *Amano* is only used to form a salt bath for testing the recording sensitivity of a reversible thermosensitive medium via an initial white opaque density (ODWI). It is neither in the field of Applicants' invention nor reasonably pertaining to forming a container or parison of a specific polyester resin material. Additionally, the *Schmidt* reference's teachings do not render Claim 8 (or Claims 17-18) obvious. Applicants respectfully disagree that *Schmidt* teaches an NSR in the range of less than or equal to 9.6. The cited Paragraph

[0073] of *Schmidt* merely discusses planar stretch ratios for a container, based on underlying hoop stretch and axial stretch ratios, but does not indicate the NSR of the materials employed.

For all of these reasons, Applicants respectfully submit that the claimed invention is non-obvious and patentable in view of the cited references, whether considered singly or in combination; thus, favorable reconsideration and allowance of Claims 1-18 is requested.

#### **NON-STATUTORY OBVIOUSNESS-TYPE DOUBLE PATENTING**

Claims 1-9 and 17 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Patent No. 7,473,755 in view of *Shelby* et al. (U.S. Pub. No. 2002/0166833) and *Sprayberry* et al. (WO 98/48994). This rejection is respectfully traversed. As discussed above in the context of the obviousness rejections, neither *Shelby* nor *Sprayberry* teaches an NSR of less than 10 (Claims 1-7 and 9) or less than 9.6 (Claims 8 and 17) for the polyester resin compositions. Applicants further reserve the right to respond in full to the obviousness type double patenting rejection when the claims are allowed over the prior art.

## CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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